



Project Abstract

Hedonic Models of Location Decisions with Application to Geospatial Micro-data

0433990

Rosa L. Matzkin

Northwestern University

James J. Heckman

University of Chicago

Luc Anselin, Lars Nesheim and Gale Boyd

Argonne National Laboratory

The sorting of firms to locations, workers to firms, and families to neighborhoods are important elements of economic life. Central to the theory of local public goods and housing markets is the sorting of people into group of agents, in order to exploit their comparative advantages. Agents specialize in the activities that are most beneficial to them. Peoples' choices about where to work and live, and firms' choices about where to locate and operate, are dynamic processes driven by a variety of factors, many of which are geospatial in nature. These geospatial factors include inherent physical attributes (e.g. rivers), human-created physical attributes (e.g. public infrastructures), and dynamic social and economic interrelationships (e.g. geopolitical entities like school districts, taxing bodies, or local zoning boards.) Two issues have limited the scientific understanding of these types of processes and their role in human and social dynamics. First, data limitations have often prevented social scientists from accurately measuring a combination of geospatial and socioeconomic factors at a scale sufficiently fine to disentangle the role each plays in economic and social decision processes. Second, sophisticated economic models accounting for the diversity and heterogeneity of firms and consumers and the richness of the equilibrium sorting process are only now reaching their full empirical potential. This project addresses both issues. It develops spatial social science tools to track the geospatial characteristics of human social sorting processes (of both firms and households), and it uses this together with new developments in hedonic analysis. This provides a method for modeling social dynamics by estimating the value of location-specific attributes, both for inherent geophysical attributes as well as for those that are created over time by human interaction. The model generates a characterization of the equilibrium resulting from the sorting process of firms, workers, and households, and provides a structure that can be estimated with the generated geospatial data. This will enable researchers to describe spatial data, and allow them to identify and estimate structural features of the data, which can then be used to understand how the economic and social system will respond to changes in the economic environment such as technological and demographic changes. Several data sources will be combined in this project to create measures of geospatial attributes, and use them with the hedonic methodology to study specific empirical models of location decisions and location equilibrium.

Our research activities during our first year have concentrated on developing the tools necessary to apply hedonic equilibrium to specific empirical models of the dynamic process of location



decisions. The development of these tools required work on the theory, computation, and estimation of these specific models. On the theoretical front, we have worked on the theoretical properties of equilibrium in hedonic models. This work has included investigation of the links between hedonic economies and the mathematical theory of optimal transport, study of the theoretical properties of hedonic equilibrium including existence, uniqueness, the possibility of bunching, and the dependence of equilibrium properties on parameters. On the computational front, we have been developing algorithms to compute equilibria in hedonic models. On the econometrics front, we have worked on developing the econometric tools necessary to estimate hedonic models.

This project will develop and combine theoretical and empirical advances in hedonic models of human and social dynamics with advances in spatial social science. It will provide a better understanding of the dynamics of sorting. It will provide modeling tools to study the mechanisms of social and economic dynamics in the context of location decisions. It will provide empirical tools to measure geospatial attributes. These new tools will be applicable to many policy relevant issues that have important social implications, including environmental justice, racial segregation, school quality, community infrastructure, public amenities, and noxious facilities. Researchers in many fields, including economics, geography, GIS science, and regional science, will be able to take advantage of the new tools, which will be widely disseminated.